axial striae but without pustules. Mitra langfordiana is marked with dark red-brown bands, while M. peasei is buff with slender brown cords and no large color bands. The aperture is creamy yellow in M. langfordiana, white in M. peasei; the columellar folds in M. langfordiana are coarser, and less evenly graduated from large to small than those in M. peasei.

Mitra langfordiana is probably more similar to M. papilio (Link, 1807) (syn. M. sphaerulata Martyn) than to M. peasei, though differing widely from this species in ornament and coloration. Their similarities are chiefly in their general proportions and coarse ornamentation, M. peasei being of a slim, delicate appearance while M. papilio and M. langfordiana share a strong, robust form.

Acknowledgment

I should like to express once again my gratitude to all who helped me with the problems relating to this study; in addition to those already named, without whom it could not have been attempted, I will mention the curators of the various museums where I was privileged to visit in person; Miss Virginia Orr who so promptly furnished the information I needed from ANSP; Dr. Rudolf Stohler who generously translated German literature dealing with Mitra sanguinolenta; and as always, Crawford Cate whose patience and understanding provided a helpful environment in which to work.

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Hybrids between *Cypraea tigris* Linnaeus, 1758 and *Cypraea pantherina* Solander, 1786 (Mollusca : Gastropoda)

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Cypraea tigris Linnaeus, 1758, and C. pantherina Solander, 1786, have been classified as distinct species by all authors; there are many distinctive characters which have been discussed by Schilder & Schilder in 1939 (p. 185). Cypraea tigris lives in the Indo-Pacific Ocean from the coast of East Africa to Polynesia, whereas C. pantherina is restricted to the Red Sea.

Recently we have received from Mr. W. L. Lander, Aden, a series of cowries collected by himself at Aden last year. The series includes both Cypraea tigris and C. pantherina with typical features as well as several intermediate specimens with mixed or intermediate characters: these shells cannot be determined exactly as C. tigris nor as C. pantherina, and they should be regarded as hybrids, we think. Similar intermediates (and true C. pantherina) have been collected, several decades ago, by Major Yerbury also at Aden; they are preserved now in the British Museum (see Schilder & Schilder, 1939, p. 185). A further intermediate shell approaching C. tigris has been collected on the opposite shore of the Gulf of Aden at Jibuti; it is preserved among the duplicates in the Jousseaume Collection (Museum of Paris).

The pale dwarf shells, however, which we have named Cypraea pantherina catulus in 1924 (p. 192) should be classified as C. pantherina according to the present paper, as the holotype only shows some characters recalling C. tigris a little. This variety undoubtedly comes from Aden too, as the holotype and the paratype have been collected by Steindachner and have been given to the author by the late curator of the Museum of Vienna, R. Sturany, in 1920; later on, we have seen three very similar shells also said to come from Aden: two in the Sullioti Collection, Genoa (one of which is now in the writer's collection), and one collected by Yerbury (see above).

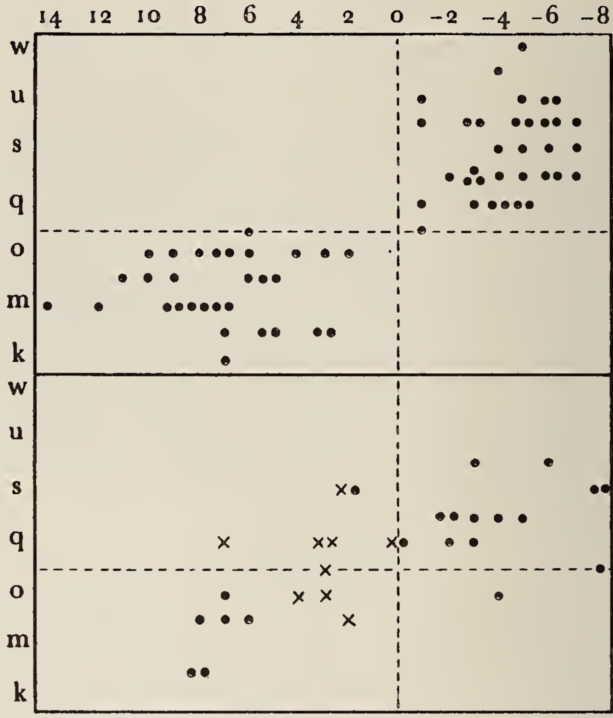
In the present paper we have treated 30 Cypraea tigris from the Western Indian Ocean between Kenya (leg. R. S. Benton), Mozambique (leg. Peters), and the Seychelles (leg. Winckworth), 34 C. pantherina from the Red Sea between Suez and Assab (various collectors), and 30 specimens from the Gulf of Aden, viz. 29 from Aden (leg. Lander, Yerbury) and one from Jibuti (leg. Jousseaume). We have classified the following four most essential characters:

1. The relative breadth of the shell, i. e., the maximum breadth expressed in percent of the length. There is a distinct correlation between this character and the swelling of margins and base: narrow shells exhibit steep margins and flat bases, whereas in broad shells both margins and base are convex. Besides, there is a distinct correlation between the length and the average relative breadth, so that in both species small specimens are usually broader than large ones. The common limit separating most specimens of the broader Cypraea tigris and the slender C. pantherina is about the relative breadth "B" (in percent) in shells of the length "L" (in mm.) as follows:

L	45	50	55	60	65	70	75	80	85	90	95	100
B	70	69	68	67	66	65	64	63	62	61	60	59

Therefore, the corrected relative breadth of each shell can be expressed by a positive or negative figure, indicating the difference between the real relative breadth and the limit between the two species as indicated above.

2. The relative closeness of the columellar teeth expressed by the letters "k" to "w" as explained by Schilder in 1958. The corresponding figures indicating the relative number of columellar teeth in shells of 25 mm. (Schilder & Schilder, 1938, p. 124) have been added in the table below.



The upper half of our diagram shows the correlation between these two characters in 30 Cypraea tigris (left below) and 34 C. pantherina (right above) from the Indian Ocean and from the Red Sea, respectively: there is a distinct gap between the two species. The lower half of the diagram shows the variability of the shells coming from the Gulf of Aden: there is a continuous zone from typical C. tigris to typical C. pantherina, the centres of which seem to be slightly displaced towards the common limit (the crosses indicate specimens believed to be real hybrids).

Additionally, we have examined two more characters evidently independent from the two characters just discussed:

3. The posterior extremity of the inner lip, varying from very blunt to acuminately produced and curved to the left.

4. The size and the color of the lateral spots bordering the base, which vary from large and dark brown to small and pure orange.

In each of these four characters we have distinguished six classes: class 2 and 5 indicate typical Cypraea tigris and C. pantherina, respectively; class 3 and 4 designate intermediate degrees; and class 1 and 6 designate extreme characters. The meaning of the figures is as follows:

Class	Corrected Relative Breadth	Columellar Teeth	Posterior Extremity	Lateral Spots
1	+14 to + 9	k - l (14-15)	Very blunt	Very large, dark
2	+ 8 to + 5	m - n (16)	Rather blunt	Large, dark
3	+ 4 to + 1	o - p (17-18)	Rather acuminate, but straight	Large, partially paler
4	0 to - 2	q - r (19)	Acuminate, slightly impressed on the left	Smaller, brown only
5	- 3 to - 5	s - t (20-21)	Distinctly bent to the left	Small, brownish and orange mixed
6	- 6 to - 8	u - w (22-24)	Extremely produced and bent	Small, orange only

The following list contains the 94 specimens just examined personally, with four figures indicating the classes of the four characters arranged as in this table; in each group the specimens have been enumerated according to the sum of the four figures.

Cypraea tigris from East Africa

Kenya	Mozambique
1211	1212
1221	1232
1221	3142
1222	
1222	
1321	
1321	
2123	
2132	
2132	
2213	
2222	
2222	
2231	
3122	
2142	
2322	Seychelles
2331	2222
2332	2232
3232	2233
3332	2332
3343	2342

Aden Gulf (X = hybrids)

Lander	Yerbury
2122	X 3242
2221	X 3443
2231	X 3345
2133	5455
2322	5455
2233	6555
X 3343	6555 cat.
X 3335	
X 3533	
X 2454	
X 4443	Jibuti
3554	X 3432
4445	
4455	
4455	
4455	C. t. catulus
5455	5346 typ.
5456	6365
5565	6556

Cypraea pantherina from Red Sea

4354	5454
4454	5455
4455	5455
4554	5455
5445	5455
5445	5455

5545	5546	6545	6556
5554	5546	5655	6565
5554	5645	6555	6655
5554	5645	6555	6665
4655	6446		
5456	6455		
5465	6455		

We can plot these figures by pairs:

		TYPICAL REGIONS							ADEN GULF					
Breadth		1	2	3	4	5	6		1	2	3	4	5	6
Teeth	6	-	-	-	1	3	2	6	-	-	-	-	-	-
	5	-	-	-	1	6	5	5	-	-	2	-	1	3
	4	-	-	-	2	10	3	4	-	1	2	5	4	-
	3	2	5	2	1	-	-	3	-	1	3	-	1	1
	2	7	7	1	-	-	-	2	-	3	1	-	-	-
	1	-	4	2	-	-	-	1	-	2	-	-	-	-
Spots		1	2	3	4	5	6		1	2	3	4	5	6
Posterior Extremity	6	-	-	-	-	3	-	6	-	-	-	-	2	-
	5	-	-	-	7	13	2	5	-	-	-	2	8	2
	4	-	3	1	-	6	3	4	-	1	3	-	2	1
	3	2	8	1	-	-	-	3	1	1	3	-	1	-
	2	5	7	1	-	-	-	2	1	2	-	-	-	-
	1	1	1	1	-	-	-	1	-	-	-	-	-	-

One will observe that the figures accumulate in the lower left quarter (Cypraea tigris) and in the upper right quarter (C. pantherina), if we consider the East African and the Red Sea specimens only (the two left tables: the species are separated by the vertical line between class 3 and 4 regarding the breadth and the spots); in the Aden shells (the two right tables), however, there is a uniform band across the table. This fact may be shown both by considering the two characters first indicated (breadth and dentition: the two upper tables) as well as by comparing the two last-named ones (lateral spots and posterior extremity: the two lower tables).

The sum of the four figures designating the four characters of each shell indicates the general tendency of the specimen to approach typical Cypraea tigris (4 x 2 = 8) or C. pantherina (4 x 5 = 20); sums which are outside these limits 8 to 20 indicate specimens with exaggerated specific characters, while sums between 8 and 20 indicate shells intermediate in a more or less distinct way. The following table contains the sums obtained from 30 East African C. tigris (T), 34 C. pantherina from the Red Sea (P), and 30 shells from the Gulf of Aden, separated into true C. tigris (t), true C. pantherina (p), and intermediate shells thought to be hybrids (h):

SUM	T	P	t	p	h
5	1	-	-	-	-
6	3	-	-	-	-
7	4	-	2	-	-
8	10	-	1	-	-
9	4	-	2	-	-
10	5	-	1	-	-
11	2	-	-	-	1
12	-	-	-	-	1
13	1	-	-	-	1
14	-	-	-	-	3
15	-	-	-	-	3
16	-	1	-	-	-
17	-	1	-	2	-
18	-	5	-	4	-
19	-	9	-	3	-
20	-	11	-	2	-
21	-	3	-	3	-
22	-	3	-	1	-
23	-	1	-	-	-

This table confirms that the fauna of Aden contains both species and real intermediates.

Note: Mr. Lander found true Cypraea tigris at Tarshyne Point only, and the hybrids seem to be restricted to the same area, whereas typical C. pantherina have been collected also in remote areas of the Aden region: the material is still too scanty, but it seems to point to the local genetic influence of C. tigris. The dwarf C. pantherina catulus may live in a very restricted place not yet detected by Mr. Lander.

Summary

Cypraea tigris Linnaeus, 1758, and C. pantherina Solander, 1786, are well separable if they come from regions where only one species lives; in the Gulf of Aden, however, where both species occur in the same place, one can observe intermediate shells of various degrees which should be interpreted as hybrids.

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Preliminary Report on Time Elements involved in Hydrotropism in *Helix aspersa* (Gastropoda : Pulmonata) Following Dehydration

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(3 Textfigures)

It has long been known that certain terrestrial animals tend to accumulate either in dry or wet areas. The terrestrial snail Helix aspersa is of the first type. Under dry conditions this animal will go into a state of dormancy, which may be changed to a state of activity upon moistening the animal or upon the introduction of water to its immediate area (Tryon, 1882).

One adaptive mechanism in some animals is a behavioral tendency to select a region of optimum humidity. In arthropods there is an optimal humidity for various species, and such functions as reproductive rate, rate of individual development, proportion of individuals maturing are increased under optimal humidity conditions (Ludwig, 1945). African migratory locusts prefer dry air to wet air (Kennedy, 1937) and a similar preference is found in the mealworm beetle (Gunn and Pielow, 1940). Cockroaches have a mixed reaction to a humidity gradient, but they become more hygropositive when dessicated (Gunn and Cosway, 1938). The wood